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Formerly 0280-824-4700

NAVSHIPS 94972

(Non-Registered)

TECHNICAL MANUAL

for

POWER SUPPLY

PP-3495A/UG

AEROTRONIC CONTROLS COMPANY

CHICAGO, ILLINOIS

DEPARTMENT OF THE NAVY
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TABLE OF CONTENTS

SECTION 1 - GENERAL INFORMATION

Paragraph		Page
1-1.	Functional Description	1-2
1-2.	Reference Data	1-2
	SECTION 2 - INSTALLATION	
2-1.	Site Selection	2-0
2-2.	Power Requirements	2-0
2-3.	Terminal Board Connections	2-0
2-4.	Voltage Adjustment	2-0
	SECTION 3 - OPERATION	
3-1.	Operating Procedures	3-0
	SECTION 4 - PRINCIPLES OF OPERATION	
4-1.	Functional Description	4-1
	SECTION 5 - TROUBLESHOOTING	
5-1.	General	5-0
	SECTION 6 - REPAIR	
6-1.	Failure Report	6-1
6-2.	Adjustments	6-1
6-3.	Repair	6-1
	SECTION 7 - PARTS LIST	
7-1.	Introduction	7-1
7-2.	Maintenance Parts List	7-1
7-3.	List of Manufacturers	7-1

LIST OF ILLUSTRATIONS

SECTION 1 - GENERAL INFORMATION

Figure		Page
1-1.	Power Supply PP-3495A/UG	1-1
1-2.	Power Supply PP-3495A/UG System Diagram	1-2

LIST OF ILLUSTRATIONS (Cont'd)

SECTION 2 - INSTALLATION

Figure		Page
2-1.	Power Supply PP-3495A/UG Outline Drawing	2-0
2-2.	Terminal Board Connections 48-Volt Output	2-1
2-3.	Terminal Board Connections 120-Volt Output	2-1

SECTION 3 - OPERATION

3-1.	Power Supply PP-3495A/UG Front View	3-0

SECTION 6 - REPAIR

6-1.	Power Supply PP-3495A/UG Top View	6-2
6-2.	Power Supply PP-3495A/UG Schematic Diagram	6-3
6-3.	Power Supply PP-3495A/UG Wiring Diagram	6-4

LIST OF TABLES

SECTION 7 - PARTS LIST

Table		Page
7-1.	Maintenance Parts List	7-2

SECTION 7 - PARTS LIST

7-2.	List of Manufacturers	7-3

Figure 1-1. Power Supply, PP-3495A/UG

SECTION I
GENERAL INFORMATION

1-1. FUNCTIONAL DESCRIPTION.

Power Supply PP-3495A/UG is a unit designed to produce either 120 or 48 volts d. c. when operated from a 120 volt a. c., 50- or 60-cycle supply. The d. c. voltage output is regulated and will remain constant within plus or minus 5% with an a. c. voltage input change of plus or minus 10% at a load of 1.0 ampere.

Power Supply PP-3495A/UG is intended to be used as a d. c. supply for the operation of teletypewriters, radio adapters, and associated equipments.

Figure 1-2 shows Power Supply PP-3495A/UG used in a typical radio teletype system.

No vacuum tubes are used and the unit requires no operational adjustments.

The circuit comprises a power transformer, a silicon bridge rectifier, an inductance-capacitance filter, and a d. c. voltage regulator consisting of a magnetic amplifier and Zener diodes. Fuses are provided for overload and short circuit protection and a pilot light indicates when the power is on.

1-2. REFERENCE DATA.

a. Navy Type: Power Supply PP-3495A/UG.
Commercial Type: Power Supply 9100P-06

b. Contract: NObsr 89233

c. Contractor:
Aerotronic Controls Co.
Chicago, Illinois

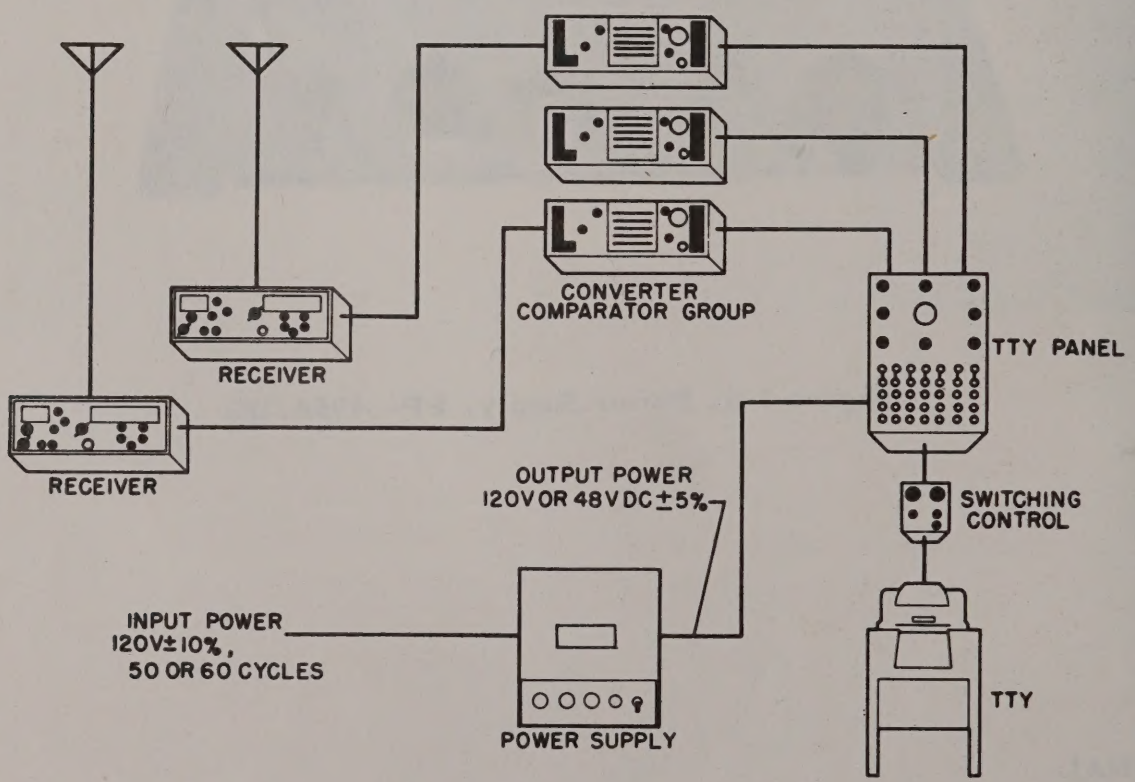

Figure 1-2. Power Supply PP-3495A/UG System Diagram

d. Inspector: Inspector of Naval Material, Chicago, Ill.

e. Number of Packages: One complete unit per package

f. Cubical Contents: 1012.5 cubic inches uncrated

g. Total Weight: 41.5 pounds

h. Power Supply: 120 volts, plus or minus 10%, 50 or 60 cycles, plus or minus 5%, single phase

i. Output Voltage: 120 or 48 volts d.c., plus or minus 5% at 1.0 ampere

SECTION 2
INSTALLATION

2-1. SITE SELECTION.

Power Supply PP-3495A/UG may be located on any shelf, table, deck, or other horizontal surface. Sufficient clearance should be provided from other equipment and structures to allow adequate ventilation.

Figure 2-1, Power Supply PP-3495A/UG Outline Drawing, indicates the over-all dimensions. Six 1/4-20 bolts are required to fasten the unit to its foundation.

2-2. POWER REQUIREMENTS.

Power Supply PP-3495A/UG operates from a 120-volt, 50- or 60-cycle, single phase supply.

A removable plate is provided on the rear of the cabinet for access to the cable terminations and voltage adjustment control R5. Cable entrance area for stuffing tube is indicated on enclosure as shown in figure 2-1.

2-3. TERMINAL BOARD CONNECTIONS.

Terminal board connections for output voltages of 48 volts and 120 volts are shown in figures 2-2 and 2-3.

2-4. VOLTAGE ADJUSTMENT.

After connecting as shown in figures 2-2 or 2-3 for the desired voltage, fine adjustment of voltage is obtained by means of control R5. To adjust R5, loosen locking nut, turn shaft with screwdriver for desired setting and retighten locking nut.

10

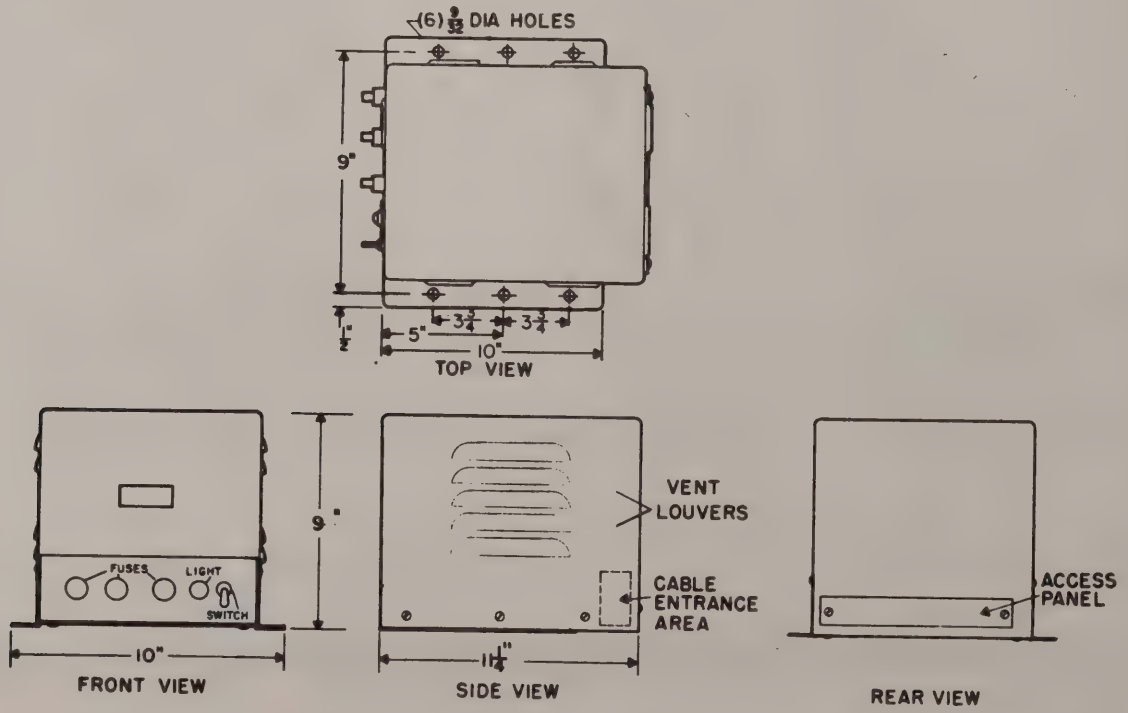

Figure 2-1. Power Supply PP-3495A/UG Outline Drawing

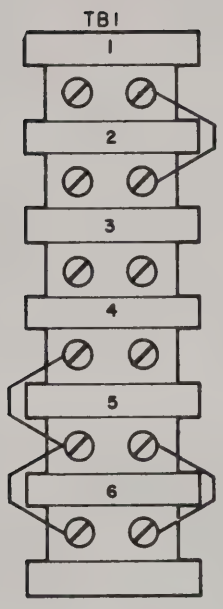

Figure 2-2. Terminal Board Connection 48-Volt Output

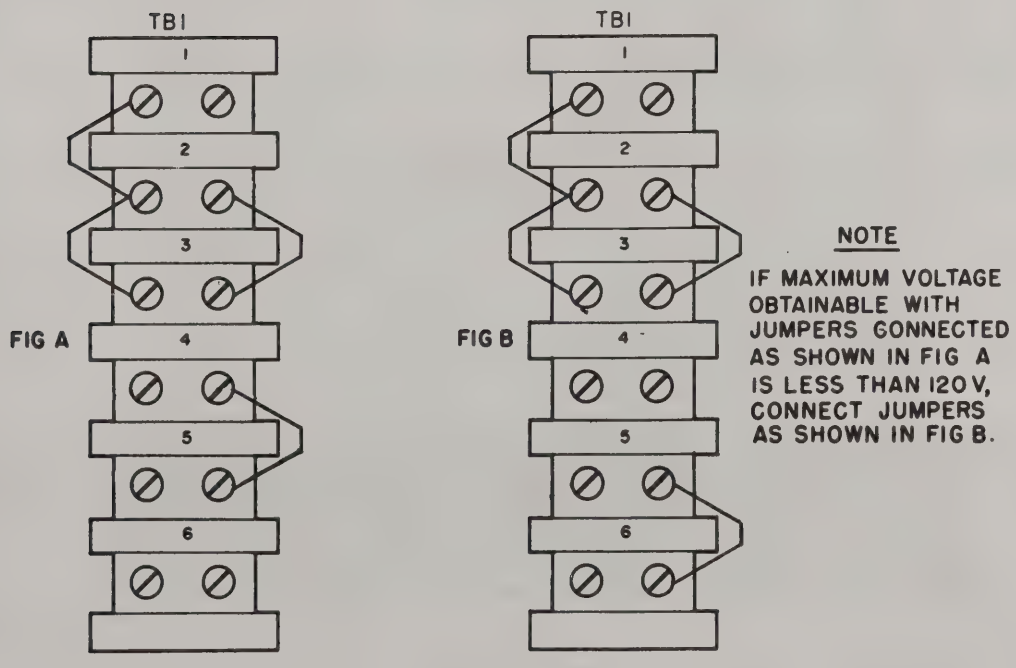

Figure 2-3. Terminal Board Connections 120-Volt Output

SECTION 3
OPERATION

3-1. OPERATING PROCEDURES.

With Power Supply PP-3495A/UG properly wired to the a.c. source and its d.c. load, and set for desired output voltage as per paragraph 2-4, it is energized by placing the a.c. power line switch in the ON position. The power light DS1 should come on, indicating that a.c. power is available to the Power Supply.

Figure 3-1, Power Supply PP-3495A/UG Front View, shows the location of the power line switch, power light and fuses.

Power Supply PP-3495A/UG may be closed down by placing the a.c. power line switch S1 to the OFF position. No other operation or special precautions are necessary.

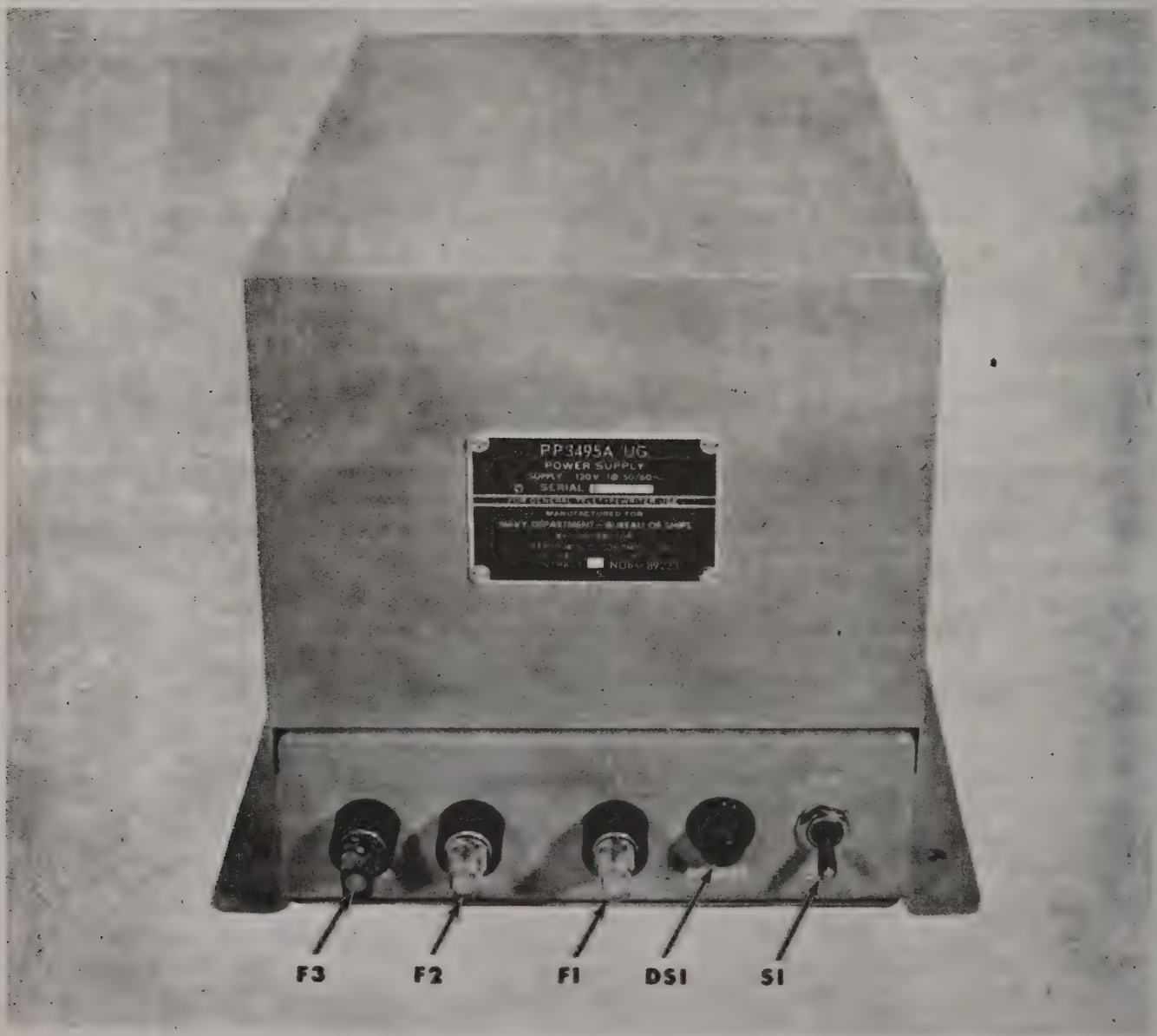

Figure 3-1. Power Supply PP-3495A/UG Front View

SECTION 4
PRINCIPLES OF OPERATION

4-1. FUNCTIONAL DESCRIPTION.

Power Supply PP-3495A/UG (see figure 6-2) operates from a 120-volt, 50- or 60-cycle, single phase, a.c. source. Terminal board TB1 may be connected for an output voltage of 48 volts (see figure 2-2) or 120 volts (see figure 2-3).

When switch S1 is in the ON position, input power is applied through radio frequency interference filter Z2, lighting POWER indicator DS1. The negative half-cycle of the input voltage is passed through diode CR7 and an input winding of the magnetic amplifier to the primary of transformer T1. The positive half-cycle is passed by diode CR8 and the other input winding of the magnetic amplifier to the primary of transformer T1. The magnetic amplifier provides voltage regulation as described below.

The voltage across the primary of transformer T1 is induced across the secondary which provides outputs of approximately 48 volts and 120 volts on pins 4 and 5, respectively. The voltage is stepped-down across the center-tapped secondary which provides two 9-volt outputs. The center-tapped secondary is a voltage supply used to compensate for variations caused by the 5% tolerance of the Zener diodes, CR1 and CR2. The selected voltage (either 48 volts or 120 volts) is full-wave rectified by bridge rectifier CR3, CR4, CR5, and CR6. For a 48-volt output, the rectified voltage is filtered by inductor L1 and capacitor C1; resistor R4 is a bleeder. For a 120-volt output, the rectified voltage is filtered by inductor L1 and capacitors C2A and C2B; resistor R3 is a bleeder.

Voltage regulation of plus or minus 5% is achieved by varying the degree of saturation of the magnetic amplifier to compensate for load and line variations. The bias winding of the magnetic amplifier (in series with resistor R2) biases the magnetic amplifier partially into saturation. The bias winding is energized through resistor R2. The control winding of the magnetic amplifier (in series with fuse F3) senses voltage variations in the output and varies the voltage drop across the magnetic amplifier, thereby adjusting the voltage across the primary of transformer T1. The control winding is voltage referenced by voltage reference diodes CR1 and CR2 in series with potentiometer R5. Potentiometer R5 is adjusted until the desired output voltage is reached. Fuse F3 provides protection against short circuiting of the Zener diodes.

SECTION 5
TROUBLESHOOTING

5-1. GENERAL.

NOTE

The Bureau of Ships no longer requires the submission of failure reports for all equipments. Failure Reports and Performance and Operational Reports are to be accomplished for designated equipments to the extent required by existing directives. All failures shall be reported for those equipments requiring Failure Reports.

If d.c. output voltage is absent make the following checks:

a. Observe power indicating light DS1 for the presence of input power.

b. Check blown fuse indicators for XF1 and XF2. The neon lights in the knob sections of these fuseholders will glow to indicate a blown fuse.

c. Check the a.c. voltage at the input to the bridge silicon rectifier. This should read approximately 48 or 120 volts. If an abnormally low voltage is indicated, an open condition may exist in transformer T-1, in magnetic amplifier Z1, or in rectifiers CR7 or CR8.

d. Check the d.c. voltage across the filter capacitors. This should read approximately 48 or 120 volts. If no d.c. voltage is indicated, check capacitors C1, C2A, and C2B where applicable for a possible shorted condition. Defective silicon rectifiers CR3, CR4, CR5, and CR6 will also cause the d.c. voltage to be low or absent.

14

e. Excessive variations in the d.c. output voltage may be caused by defective Zener diodes CR1 and CR2, magnetic amplifier Z1, diodes CR9 and CR10, or resistors R1, R2, and R5. Check indicating fuseholder XF3. If it indicates fuse has blown, diode CR1 or CR2 may be shorted.

SECTION 6
REPAIR

6-1. FAILURE REPORT.

NOTE

The Bureau of Ships no longer requires the submission of failure reports for all equipments. Failure Reports and Performance and Operational Reports are to be accomplished for designated equipments to the extent required by existing directives. All failures shall be reported for those equipments requiring Failure Reports.

15

6-2. ADJUSTMENTS.

Except for control R5 described in section 2-4, Power Supply PP-3495A/UG does not require any operational adjustments.

6-3. REPAIR

Figure 6-1 indicates the parts location in Power Supply.

Before any part is tested for a suspected defect, it should be disconnected from the circuit.

Circuit continuity and test points may be readily determined from figure 6-2, schematic diagram; and figure 6-3, wiring diagram.

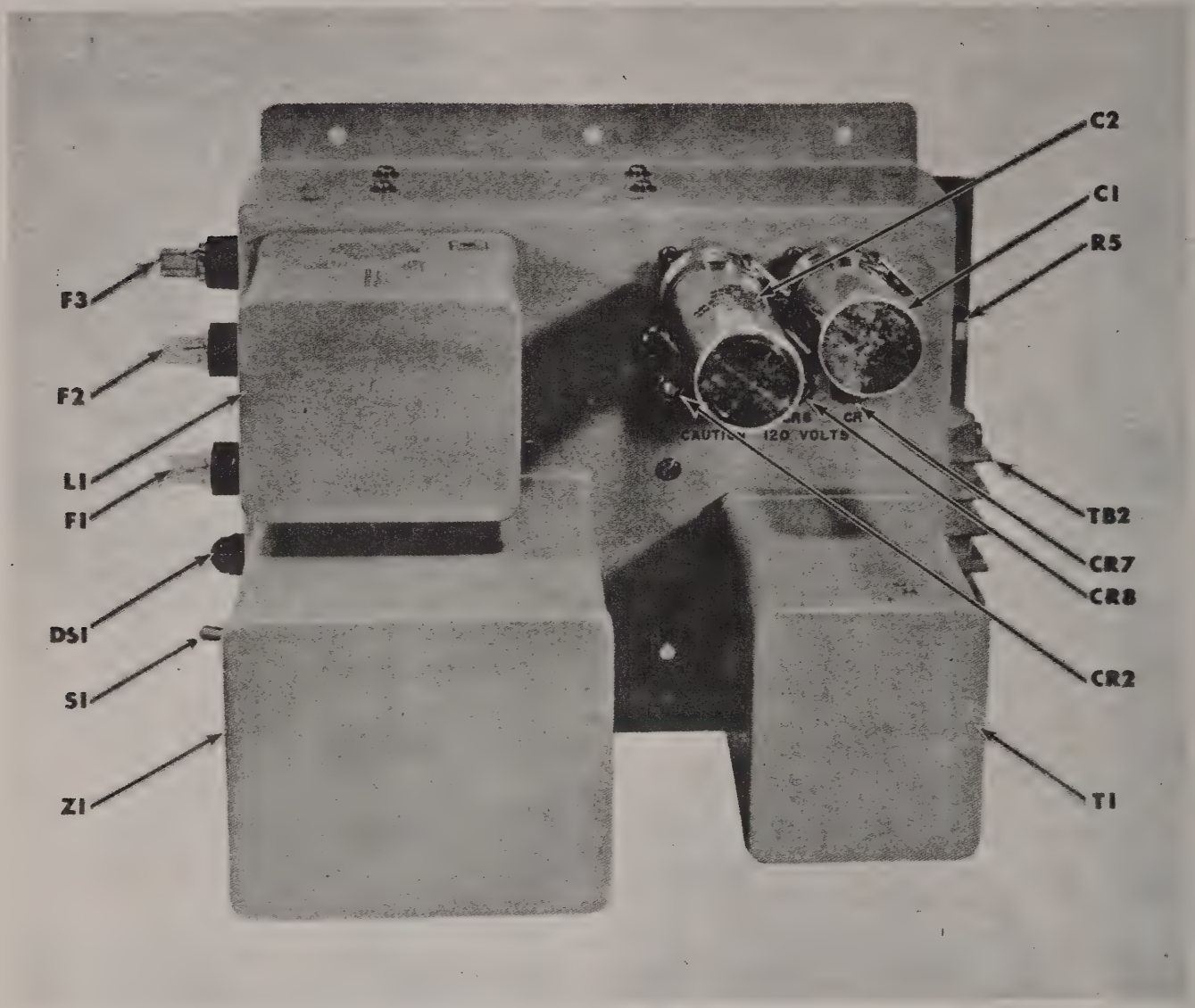

Figure 6-1. Power Supply PP-3495A/UG Top View

16

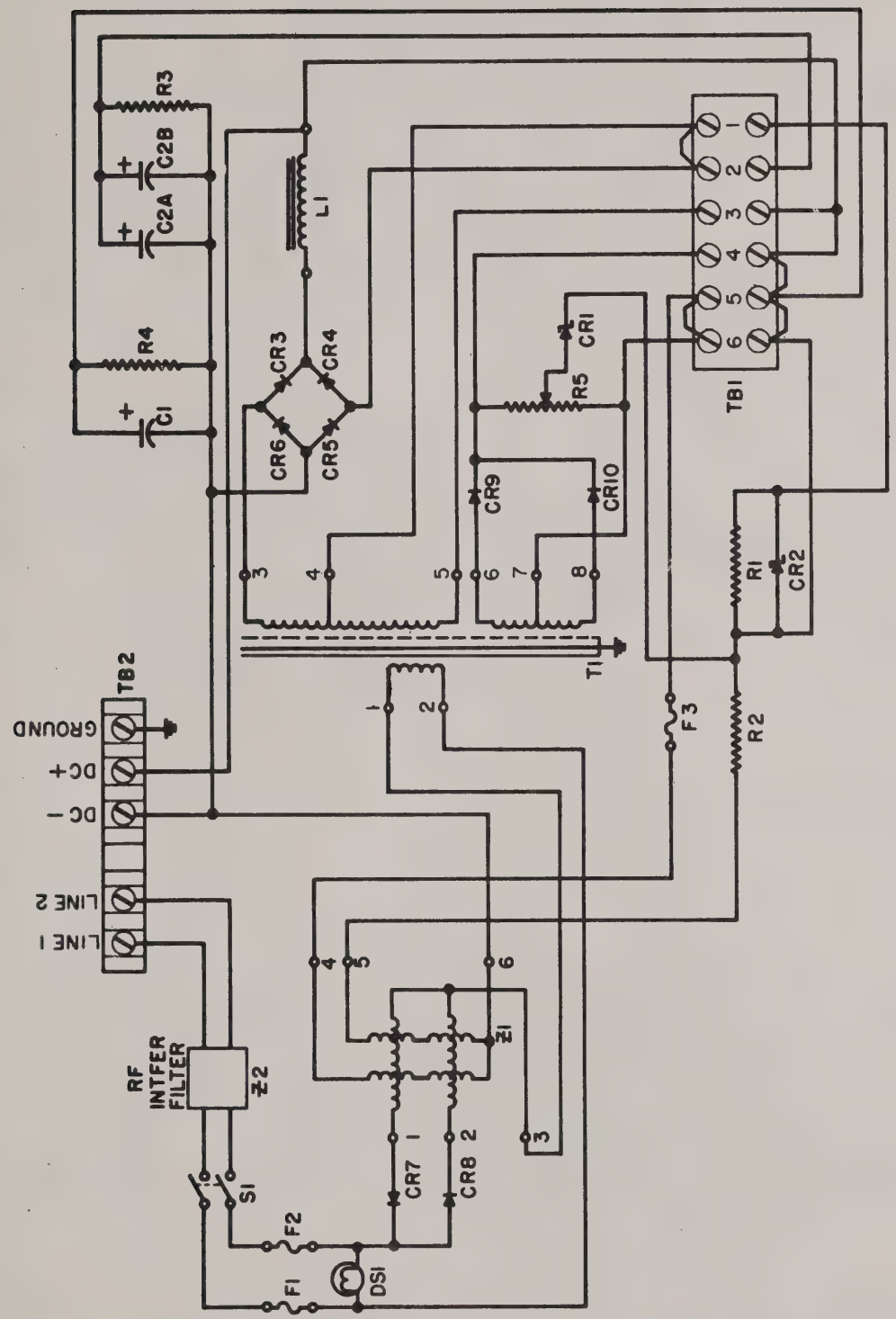

Figure 6-2. Power Supply PP-3495A/UG Schematic Diagram Wired for 48-Volt Operation

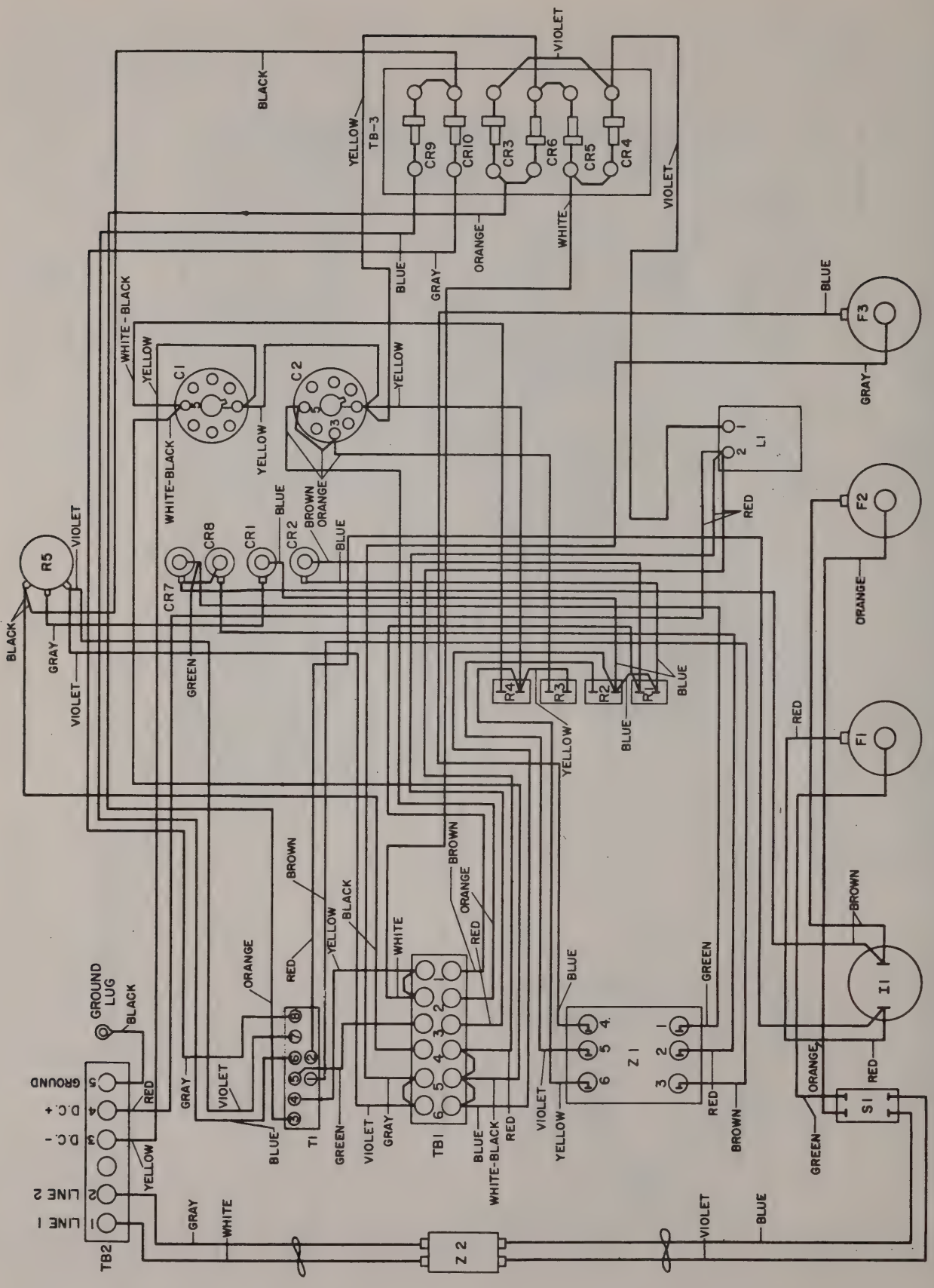

Figure 6-3. Power Supply, Wiring Diagram, Connected for 48-Volt Operation

SECTION 7
PARTS LIST

7-1. INTRODUCTION.

a. Reference designations, previously referred to as circuit symbols, have been assigned to identify all maintenance parts of the equipment. They are used for marking the equipment, adjacent to the part they identify, and are included on drawings, diagrams, and the parts list.

b. Stock number of parts used in this equipment may be obtained by referring to the Stock Number Identification Table (SNIT) published by E.S.O.

7-2. MAINTENANCE PARTS LIST.

Table 7-1 lists the maintenance parts for Power Supply PP-3495A/UG

Column 1 lists the reference designation of the various parts in alphanumerical sequence.

Column 2 lists the name and description of the various items.

Column 3 lists the locating function of the part in the equipment.

7-3. LIST OF MANUFACTURERS.

Table 7-2 lists manufacturers of parts used in the equipment. Column 1 indicates the abreviations used to identify the Manufacturers.

Table 7-1. Maintenance Parts List

Reference Designation		Locating Function
CR1	SEMICONDUCTOR DEVICE, DIODE, 43V 10W, Zener, MIL type 1N2993B	Figure 6-3
CR2	SEMICONDUCTOR DEVICE, DIODE, 75V 10W, Zener, MIL type 1N3002B	Figure 6-3
CR3	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR4	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR5	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR6	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR7	CRYSTAL UNIT, RECTIFIER; MIL type 1N1124A	Figure 6-3
CR8	CRYSTAL UNIT, RECTIFIER; MIL type 1N1124A	Figure 6-3
CR9	CRYSTAL UNIT, RECTIFIER; JAN 1N538	Figure 6-3
CR10	CRYSTAL UNIT, RECTIFIER; JAN 1N538	Figure 6-3
C1	CAPACITOR, FIXED, ELECTROLYTIC; 500 mfd, 50 vdc, MIL type CE51C501G	Figure 6-3
C2	CAPACITOR, FIXED, ELECTROLYTIC; 160-160 mfd, 150 vdc, MIL type CE52C161J	Figure 6-3
DS1	LAMP, NEON: General Electric Co. Part No. NE-51	Figure 6-3
F1	FUSE; 4 amp, MIL type FO2A250V-4A	Figure 6-3
F2	FUSE; 4 amp, MIL type FO2A250V-4A	Figure 6-3
F3	FUSE; 1/8 amp, MIL type FO2A250V-1/8A	Figure 6-3
L1	REACTOR; AEROTRONIC P/N 82009 Type TF4RXO4JB MIL-T-27A	Figure 6-3
R1	RESISTOR, FIXED, WIRE WOUND: 1800 ohms ±5% MIL type RW29	Figure 6-3
R2	RESISTOR, FIXED, WIRE WOUND: 820 ohms ±5%, MIL type RW29	Figure 6-3
R3	RESISTOR, FIXED, WIRE WOUND: 2000 ohms ±5%, MIL type RW29	Figure 6-3
R4	RESISTOR, FIXED, WIRE WOUND: 510 ohms ±5%, MIL type RW29	Figure 6-3

20

Table 7-1 (continued)

Reference Designation		Locating Function
R5	RESISTOR, VARIABLE; 50 ohms, ±10% MIL type RA20	Figure 6-3
S1	SWITCH, TOGGLE: MS35059-22	Figure 6-3
TB1	TERMINAL BOARD: MIL type 8TB6	Figure 6-3
TB2	TERMINAL BOARD: MIL type 40TB5	Figure 6-3
T1	TRANSFORMER, POWER: AEROTRONIC P/N 82010 type TF4RX02JA, MIL-T-27A	Figure 6-3
XDS1	LIGHT, INDICATOR: MIL type LH76LC14RD	Figure 6-3
XF1	FUSEHOLDER: MIL type FHL17G	Figure 6-3
XF2	FUSEHOLDER: MIL type FHL17G	Figure 6-3
XF3	FUSEHOLDER: MIL type FHL18G	Figure 6-3
Z1	AMPLIFIER, MAGNETIC: AEROTRONIC P/N 82011 type TF4RX41MA, MIL-T-27A	Figure 6-3
Z2	FILTER, RADIO INTERFERENCE: AEROTRONIC Part No. 82012	Figure 6-3

Table 7-2. List of Manufacturers

Name	Address
General Electric Company	Miniture Lamp Div., Nela Park, Cleveland, Ohio
Bussman Mfg. Div.	St. Louis, Missouri

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